7003

COMMON –103

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BOARD DIPLOMA EXAMINATION, (C-20)

FEBRUARY/MARCH —2022

DAE - FIRST YEAR (COMMON) EXAMINATION

ENGINEERING PHYSICS

Time : 3 hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define fundamental quantities and derived quantities. Write two examples for each.

2. A force of $2\bar{i} + 3\bar{j} + 4\bar{k}$ N acts on a body and produces a displacement of $\bar{i} + \bar{j} + \bar{k}$ m. Calculate the work done.

3. A body is thrown vertically upwards with a velocity of 19.6 m/s from the ground. Find the maximum height (g = 9.8 m/s^2).

4. State the laws of friction.

5. Define work, power and energy.

6. Write the conditions for S.H.M.

7. Write any three differences between isothermal process and adiabatic process.

8. Distinguish between musical sound and noise.

9. State Kirchhoff's Laws.

10. State Coulomb's Inverse Square Law of magnetism.

PART—B

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* Define dot product. Write any six properties of the dot product. 2+6

(OR)

(b) A football is projected into air by making an angle 45° with the horizontal and with a velocity of 29.4 m/s. Find *(i)* time of ascent, *(ii)* maximum height, *(iii)* horizontal range and *(iv)* maximum range. 2+2+2+2

12. *(a)* Derive an expression for acceleration of the body *(i)* sliding down and *(ii)* moving up on a rough inclined plane. 4+4

(OR)

(b) State and prove law of conservation of energy in the case of a freely falling body. 8

13. *(a)* Derive an expression for the time period of a simple pendulum. 8

(OR)

(b) A gas at a pressure of 100 N/m^2 is compressed to half the original volume. Calculate the pressure if the expansion is *(i)* isothermal and *(ii)* adiabatic (γ = 1.4). 4+4

14. *(a)* Define noise pollution. Write causes and effects of noise pollution. 2+3+3

(OR)

(b) Define surface tension and write its SI unit. Explain surface tension on the basis of molecular theory. 2+1+5

15. *(a)* Derive an expression for magnetic induction field strength at a point on the axial line of a bar magnet placed in uniform magnetic field. 8

(OR)

(b) Define superconductor. Write its properties and applications. 1+4+3

PART—C 10×1=10

Instructions : (1) Answer the following question.

(2) Each question carries **ten** marks.

16. Derive ideal gas equation $PV=RT$. Write differences between specific gas constant and universal gas constant. 6+4

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